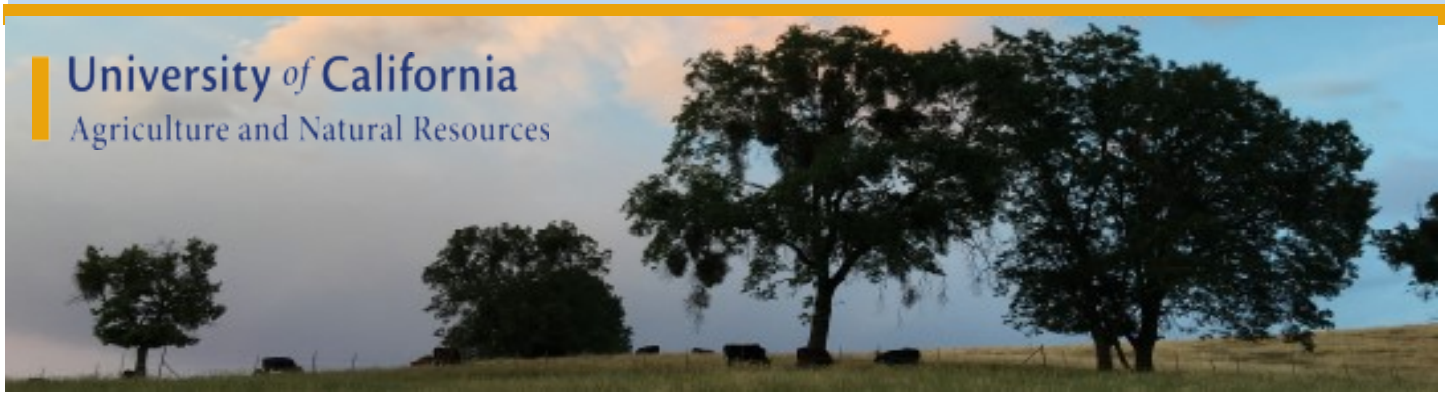
LIVESTOCK AND RANGE NEWS

SERVING VENTURA AND SANTA BARBARA COUNTIES



NEW LIVESTOCK & RANGE ADVISOR

There are nearly 2.5 million acres of rangeland in Ventura and Santa Barbara Counties, of which approximately 800,000 are grazed by domestic livestock. Rangelands support a host of services to the broader ecosystem (water storage and filtration, wildlife habitat, carbon storage) as well as provide the primary forage base for the counties' livestock industries. For generations, our ranchers have worked to sustainably manage these rangeland ecosystems while providing a quality, safe agricultural product. Increasingly, however, the county's livestock industry has faced new sets of ecological, economic, and regulatory challenges that complicate this work. In September 2017 the University of California Cooperative Extension hired me to fill the role of Area Livestock & Range advisor.

The ultimate goal of my program will be to assist producers and other land managers to successfully navigate the challenges that they face on the Central Coast. My program will provide relevant, science-based information and will develop an applicable and progressive research program to respond to the questions and needs of the local clientele. Future research and education will benefit livestock operators and rangeland managers through:

- Addressing animal health issues that will increase the welfare and productivity of livestock
- Promoting rangeland management practices that benefit both the land and the ranching operation
- Facilitating conversation between community stakeholders in order to achieve responsible management
- Improving animal genetics and performance, ranch profitability, and ecological sustainability

In this Issue

A little bit about me: after attending university and then farming on the East Coast, I returned to California in 2010 and settled in Nevada County, California, where I began working with livestock: first, I ran a ranching business that raised pigs, broiler chickens, and sheep and sold meat at local farmers' markets and to restaurants; most recently, I was the foreman for a 100-cow direct-to-consumer, grass-fed beef operation. These years on the ranch have provided me with first hand knowledge of stockmanship, rangeland ecology, herd health, business management, and an awareness of the need to balance livestock and natural resource stewardship. This experience in the industry has been supplemented by my recent graduate work. In 2016, I completed a Range Management Masters of Science degree at the University of California, Berkeley. My coursework in the ecological sciences and exposure to the social and policy dimensions of natural resource management has prepared me well to assume the role of Livestock and Range advisor in Ventura and Santa Barbara Counties.

I am most pleased to be able to serve you. Please let me know if there is anything I can do to help, and I hope to meet many of you soon. My main work these first months is to get to know local producers, agency personnel, and other land managers. Please don't hesitate to reach out with questions or comments or an invitation to visit you on your farm, ranch, or office. I can be reached by phone at 805.645.1475, by email at mwkshapero@ucanr.edu, or in person at our office in Ventura at 669 County Square Drive, Suite 100.

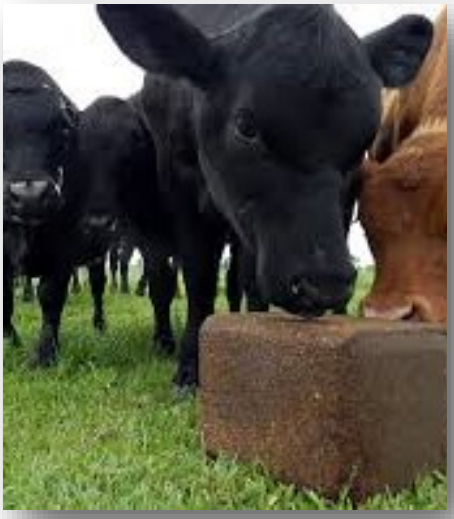
REVIEW ARTICLE: PROTEIN SUPPLEMENTATION STRATEGIES TO IMPROVE RANCH PROFITABILITY

University of California study looks at production factors most critical to profitability in cow-calf operation.

Results demonstrate that ranch profitability can be increased with strategic and focused nutritional supplementation

Most of us expect that our cows will need some degree of supplementation to carry them through the dry season here on the Central Coast. You're likely putting out protein tubs or liquid supplements starting in the summer when the grasses begin to dry and transitioning to hay in the fall and winter when what green feed that does come up is washy. Of course, both of these strategies are meant to compensate for the lower than sufficient levels of crude protein (CP) available in the annual grasses that we find on our region's rangelands from summer through winter.

It is assumed that this protein supplementation improves herd productivity by improving reproductive efficiency and increasing calf growth. The existing scientific literature, however, is surprisingly unclear about exactly how supplementation benefits mother cows or their calves. In an effort to clarify the mechanisms behind supplementation, researchers out of UC Davis conducted a five-year study that examined typical ranch supplementation practices and how they affected cattle grazing on Mediterranean-influenced California rangelands. More specifically, the researchers were interested in the long-term effects of both supplementation and stocking rate on pregnancy rate, calving interval, birth weight, weaning weight, live weight, body condition, and backfat—factors that fundamentally drive ranch profitability.



Range mother cows on a free-choice protein block during late summer. Ranchers can also choose to use tubs or liquids.

The experiment was conducted at one of the two research ranches that the University of California system operates—Sierra Foothill Research and Extension Center. The facility is a 6,000-acre working ranch in the Sierra Nevada foothills east of Sacramento. There, the researchers separated 260 British breed cows into three treatment groups: control, standard supplementation, and strategic supplementation. Each treatment group was then separated into high stocking rate and moderate stocking rate groups (see Box 1). The control group received no supplementation at all. The standard supplementation group was designed to mimic common supplementation practiced on California range by supplying protein when the available standing forage was inadequate to maintain body condition. Cows in this group had access to protein tubs from approximately mid-August until mid-November (average intake 2.7 pounds/day, 35% CP) at which point they were fed alfalfa hay until late February (average intake 6.95 pounds/day, 12% CP). And cows in the strategic supplementation

BOX 1: Stocking Rates

In the UC Davis study, the heavy stocking rate equated to 1 cow/acre; cows were moved when they had grazed the pasture down to 645-825 pounds/acre of residual dry matter (RDM). In the moderate group, cows were stocked at 0.75 cows/acre and were moved once they had grazed down to 825 pounds/acre RDM. RDM is old plant material left standing or on the ground at the beginning of a new growing season (measured in October). It indicates the combined effects of the previous season's forage production and consumption by grazing animals. See the UC publication "California Guidelines for Residual Dry Matter (RDM) Management on Coastal and Foothill Annual Rangelands" for an explanation of how long-term management of RDM can affect range health.

group were examined periodically; those with a body condition score (one to nine scale, nine being fat) greater than 5.5 were placed with the control group (no supplementation) and cows with a body condition score less than 5.5 were placed with the standard supplementation group. The basic idea behind the strategic supplementation group was to see if cows that maintained good body condition throughout the production year could adequately breed back and raise a healthy calf without supplementation. If they did, ranchers could save a considerable amount per animal on the direct costs of supplementation.

The results from the study are complex. With so many production variables (supplementation regime, age of cow, stocking rate), it was a difficult task to tease apart all the effects on pregnancy rate, calving interval, birth weight, weaning weight (205-day weight), live weight, body condition, and backfat. But let me share with you some key findings:

1. Pregnancy rates: fall-calving cows without supplementation maintained their ability to re-breed so long as forage supply was adequate (i.e. under moderate stocking); however, if forage supply was low (i.e. under heavy stocking or drought) supplementation was required. On good forage years or in pastures that are conservatively stocked, protein supplementation is not required to maintain pregnancy rates in your mother cows.

2. Calving interval: both the standard and strategic supplementation program served to decrease the calving interval (by 5 and 4 days, respectively); making a protein supplement available to your cows with low body condition, you can significantly shorten the calving interval in your herd.

3. Weaning weight: the effect of supplementation on weaning weight was unclear; stocking rate, however, significantly affected 205-day calf weights. Conservative stocking, more so than a supplementation program, ensures high weaning weights in your calves.

Box 2. The Economics of Strategic Supplementation

How much you'll save transitioning to a strategic supplementation program depends on the current market price for the different forms of crude protein. When compared to standard supplementation, the UC Davis study found that strategic supplementation resulted in 18.5%, 54.2%, 96.6% of animals being supplemented from August to calving (mid-October), calving to breeding (Dec 1), and breeding to late February, respectively.

Using average daily intakes from the UC Davis study and pulling prices from a 2008 UC Cooperative Extension cost-study analysis, "Sample Costs for Beef Cattle," a hypothetical 40-cow cow-calf herd on the Central Coast would have the following costs, assuming protein tubs are
$0.50/lb. and alfalfa hay is $0.10/lb.:

With standard supplementation, your herd is consuming:

6,480 pounds of block from mid-August to calving (162 lbs./cow) =	$3,240
3,240 pounds of block and 4,170 pounds of hay from calving to breeding (Dec 1) =	$2,037
and 25,020 pounds of hay from breeding to the end of February =	$2,502
	$7,599

With strategic supplementation, you herd would be consuming:

$3,240 (6,480 lbs of block) x 0.185 (the percent of cows being supplemented) =	$599
$2,037 (3,240 lbs of block and 4,170 lbs of hay) x 0.542 =	$1,104
$2,502 (25,020 lbs of hay) x 0.966 =	$2,417
	$4,120

Strategic supplementation would save you $3,479, which would be the equivalent of four extra 600-pound steer calves sold at auction this month.

Adequate reproduction (pregnancy rates) and weaning weights are the two most important factors in determining profitability in the cow-calf operation. This UC Davis study shows that nutrition modification can be used to alter herd performance, and hence ranch economics (see Box 2). Here are some key take-aways:

- It is critical to supplement your cows with protein to maintain pregnancy rates when forage is limited (low rainfall year or heavy stocking rates). There is no difference in pregnancy rates between cows that have sufficient forage and those that are supplemented (i.e. when it

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comes to pregnancy rates, you can compensate in low forage years with a protein supplementation).

- Cows supplemented based upon body condition ("strategic" supplementation) had similar calving intervals and gave birth to calves with similar 205-day weights as cows that were supplemented based upon forage quality or quantity (standard supplementation). In other words, strategic supplementation achieves similar production results and yet leads to fewer cows who need protein supplement (for example, between August and calving in late October, only 19% of cows required supplementation based upon body condition). This new supplementation program provides a method to decrease production costs while maintaining herd performance. With that said, sorting and separating mother cows based upon body condition and running them in different supplementation regimes presents some logistical difficulties. This program will only work if you have sufficient pastures and/or time to manage your breeding herds separately.

Feeding out baled hay during the fall and winter is a common supplementation strategy to make up for inadequate levels of crude protein in fall-germinated annual grasses. Feeding can be expensive and time-consuming, however, so must be measured against production variables.

- When it comes to ranch profitability, there is always a crucial tradeoff between how many cows you run per acre, their rate of successful pregnancy, calf weights at weaning, and protecting the range resource. You may find that running cows at more moderate stocking rates without supplementation and producing calves with higher weaning weights ends up being less profitable than running cows at elevated stocking rates, paying for supplementation, and producing more calves (per acre) that may have lower weaning weights. I would encourage you to experiment with the findings from this study and incorporate the practices that fit best your production system.

If you would like to read the original research article, I would be happy to provide it. Send me an email or come by the office in Ventura. Here is the article's citation: Renquist, B. J., Oltjen, J. W., Sainz, R. D., Connor, J. M., & Calvert, C. C. (2005). Effects of supplementation and stocking rate on body condition and production parameters of multiparous beef cows. Animal Science, 81(03), 403-411.

TRACE MINERAL CONCERNS: LOOKING AT COPPER

As I have started to drive around the counties, visit ranches, and speak with folks, the topic of copper deficiency in your cattle has frequently come up. Copper is one of many minerals that is required in very small trace amounts, usually less than one one-hundredth of an ounce per day, but that is essential to maintaining health and productivity in animals. Examples of other trace minerals include selenium, iodine, manganese, zinc, and phosphorous. Typically, the forage consumed by your livestock provides their main source of trace mineral uptake, however soils and vegetation in certain geographic areas can be deficient in particular minerals and can lead to deficiencies if not supplemented. My understanding is that producers on the Central Coast have long understood that copper is critically deficient in our area.

Copper deficiency symptoms can include swollen and painful joints, broken bones, rear leg weakness or paralysis in calves, infertility, an unthrifty appearance, anemia, and decreased resistance to disease; however, diarrhea, poor weight gains, and light hair coats (Angus are gray/red, Herefords are yellow) are the most common symptoms of copper deficiency, especially in calves. Absent these symptoms—even at low levels of deficiency—an animal's immune system can be compromised, which can make them more susceptible to disease as well as less responsive to vaccines. In all cases, copper deficiency can impact your bottom line, by way of reduced gains in your calves and stockers or increased veterinary expenses. Interestingly, copper deficiency in cattle is complicated because it can be the result of (1) low copper in the diet (a primary deficiency) or (2) interference with copper absorption in the animal due to molybdenum, sulfates, and/or other inhibitors in feed or water (a secondary deficiency). Too little is known if copper deficiencies in cattle locally is the result of a primary or secondary deficiency.

Copper can be supplemented to cattle by a variety of methods:

- Loose salt-mineral mixes with copper added
- Molasses-based supplements

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- Copper boluses
- Injectables

(Salt-mineral mixes are inexpensive; however, they can be labor intensive to keep fresh and in front of animals. It is important though that cattle have access to them year round to maintain adequate levels. Many of the commercial salt mixes you purchase at feed stores do not have sufficient copper for our area. Check labels! Mixes for our area should contain at least ~3500ppm copper. If your commercially-purchased salt-mineral mix is below 3500ppm, consider adding copper to the mix. Copper sulfate will work, however you boost the copper level, work with your veterinarian to achieve a safe combination and ratio. And be careful, as mistakes can occur. Finally, remember that sheep are extremely sensitive to copper toxicity, so it is important to make sure they do not eat any of this mineral supplement.

Molasses based supplements are formulated similar to salt mixes and can promote better consumption, but are also more expensive. Again, check commercial labels to ensure they have suffice levels of copper.

Since the 1990s, a copper oxide bolus (Copasure®) has been available and can provide supplementation for up to 12 months, depending on the severity of deficiency. Bolus administration can be frustrating, because cattle may sometimes cough the bolus up and since the coating of the bolus is water-soluble, it may melt if exposed to water or saliva. The California Cattlemen's Association sells a balling gun that fits the bolus well and seems to increase successful administration. Also, put a little bit of vegetable oil on the bolus to prevent melting due to water exposure and to help it slide down the throat. Boluses are a good method to provide cattle with long-term, slow-release copper.

Finally, there are injectable options. Injectable copper glycinate has been used for many years to treat copper deficiency, although this product was only available through veterinarians and required a prescription. Because it was no longer commercially manufactured it needed to come from a compounding pharmacy. I understand, however, that the local source for copper glycinate will soon no longer be available. Alternatively, try a product called Multi-Min® that contains an injectable form of copper carbonate. At this time, however, there is limited research to demonstrate the effectiveness of Multi-Min® as a long-term copper supplementation strategy in beef cattle. Injectables are typically less effective at long-term copper supplementation compared to salt or molasses mixes or boluses.

All can relieve copper deficiency. However, I encourage you to work with your veterinarian to develop a program specific to your operation. It is important to remember that while a little bit of copper is good, too much can be toxic. Copper toxicity is usually the result of over-administration, over-feeding, or over-consumption of copper supplements, though it is possible for copper toxicity to result from contaminated feeds. Excess amounts of copper are accumulated in the liver of an animal and under even small amounts of stress can be released in large amounts, causing acute copper toxicity.

There is little known about copper deficiency in our region and the impact it is having on cattle production. As your new Livestock & Range advisor I expect to develop a trial to test the effectiveness and compare costs associated with the various supplementation strategies outlined above. Analyses may include blood and/or liver biopsy samples from animals and soil, forage, and water samples from ranches. If you are interested in participating in a future trace mineral trial, please be in touch.

Adapted from articles by Julie Finzel (Livestock & Natural Resource advisor, Kern County) and John Maas, DVM (UCCE Veterinarian). Additional input provided by Bret McNabb, DVM (Assistant Professor of Clinical Livestock Production, UC Davis).

OPINION: MODELS HELP US SEE THE BIG PICTURE OF SUSTAINABLE AGRICULTURE

by Holland C. Dougherty

PhD Candidate, Animal Nutrition & Environment Modeling Applications Lab (ANEMAL)

As human population and per-capita income increase, demand for meat has also increased. At the same time, millions of people worldwide are food insecure, and with the environmental impacts of existing food production systems already under public and regulatory pressure, the big challenges for today's animal scientists are how do we make sure people have access to affordable, nutritious food now while minimizing the environmental impacts, both now and in the future? How do we calculate the impacts of what farmers are already doing, and see how different management strategies affect economics and the environment? These are the questions my work, and that of my colleagues in modeling of sustainable agriculture, are trying to answer. First off, what is sustainable agricul-

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ture? The USDA defines sustainable agriculture as "*an integrated system of plant and animal production practices having a site-specific application that will, over the long term:*

- *satisfy human food and fiber needs;*
- *enhance environmental quality and the natural resource base upon which the agricultural economy depends;*
- *make the most efficient use of nonrenewable resources and on-farm resources and integrate, where appropriate, natural biological cycles and controls;*
- *sustain the economic viability of farm operations; and*
- *enhance the quality of life for farmers and society as a whole."*

In other words, sustainable agriculture works to feed the current population, while ensuring that future generations benefit from a stable food supply and a healthy environment. Because of their ability to analyze and synthesize large amounts of data from a wide variety of sources, agricultural models are one of the best tools available to scientists interested in sustainability.

To see how we can improve in the future, we need to know how we are doing right now, both on the individual animal level and on the whole-system level. My research, and that of my colleagues, integrates knowledge from both levels to help producers and regulatory agencies understand the impacts of current systems as well as the effects of proposed changes. This saves time and money by informing decisions on how to balance the environmental and economic aspects of agriculture to benefit producers and consumers. Both levels of modeling are necessary to understanding agricultural systems: animal-scale models can predict the performance of the average animal in a herd in a given production system, which helps producers decide how best to achieve their production goals. When that is combined with a larger framework that looks at the whole system, from animal emissions, to fuel used to bring feed to the farm, to energy used to create consumer-ready products, to it allows us to identify and target environmental impact hotspots where money and effort can be best invested.

Animal-scale models exist for many different species of livestock, and a specific type of system-level modeling, life cycle assessment, has been used to study a wide variety of products, such as beef, yogurt, almonds, and even wine! Life cycle assessment is an interesting method because it allows for the assessment of a wide variety of environmental impacts, such as carbon footprints, water use, global warming potential, and air and water pollution. When this is applied to animal agriculture, it allows us to combine animal-level models of resources needed by the animal with the larger impacts of that resource use, and of how wastes and byproducts are handled. This can be done on a national level, but can also be used to study production in a specific region or market chain, such as my current research analyzing the carbon footprint of sheep production in California.

One of the next big areas to explore with these models is in creating a more holistic assessment of the system being studied, an area where researchers are already making great progress. For example, grass-fed stages of ruminant meat production can contribute significantly to the overall carbon footprint of a product, both because of slower weight gain and because more methane is produced from fiber-rich feeds like native grasses than from higher-starch diets like you would see in a feedlot. However, ruminants provide many benefits to native rangelands, such as grazing invasive species to prevent their spread and reducing plant matter that could become a fire hazard. Many rangelands cannot produce human-edible plants without high quantities of economically and environmentally expensive inputs, which would destroy the native ecosystems. By producing sheep and cattle, the long-term health of these systems is protected while contributing to the overall food supply, promoting agricultural sustainability.

Models are an important part of sustainability research, allowing researchers to combine large amounts of data to predict not only the impacts of current systems, but to allow us to build a better future by identifying which production and management strategies are most likely to be effective. By combining animal-scale models to predict the impact of changes for the average animal in a herd with system-level models to see the large-scale impacts of these changes, producers and regulators can work together to protect the environment while still producing a stable, sustainable food supply.

UPCOMING EVENTS

The direct annual cost to monitor and control invasive plants in California is $82 million, and the indirect economic impacts are even larger. Don't miss your opportunity to learn about novel research and effective weed management approaches on February 20 in Santa Maria at the

Knocking Out Noxious Weeds Workshop!

Workshop Agenda Includes:

- Mitigating economic losses caused by rangeland invasive
- Effective strategies to manage invasive species
- Cost-effective approaches that maximize management success
- Reduced-risk management practices that promoting biodiversity
- For additional information and to register please visit knockoutweeds.com or contact event host Matthew Shapero at mwkshapero@ucanr.edu or (805) 645-1475.

A FEW FINAL WORDS

It was a difficult ending to 2017 for many producers in Ventura and southern Santa Barbara Counties, and I want to acknowledge the challenges you continue to face after the Thomas Fire. Many of you lost all or part of your winter feed and are now needing to unexpectedly sell, ship, or feed your livestock at great effort and expense. I hope you have been able to find resources through the counties, FSA, NRCS, and UC Cooperative Extension that have felt helpful during this difficult time. I am continuing to work with the Ventura County Agricultural Commissioner's Office and Ventura County Office of Emergency Services to secure a longer-term hay resource for local producers, and it is my sincere hope that something materializes soon.

On a different note, the Thomas Fire has presented some interesting research opportunities to understand rangeland recovery and grazing post-fire. Many of you have graciously opened your ranches up to me in the weeks after the fire to take soil samples of burned sites and to set up exclosures to monitor grazing, and for that I am grateful. I hope the collected data will help us all better understand how to respond to wildfire in the future.

Sincerely,

Matthew Shapero
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Livestock and Range News is a newsletter published by the UCCE Livestock & Ranch advisor serving Ventura and Santa Barbara Counties.

The newsletter contains research, news, information, and meeting notices related to the areas of livestock production, rangelands, and natural resource management.

IN THIS ISSUE…

IMPORTANT

In keeping with the University of California commitment to the environment, hereafter Livestock and Range News will only be available electronically. To continue receiving newsletters, visit our website and enter your email address:

http://ceventura.ucanr.edu/Live_Stock_-_Range_Programs/

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